POSTER
TITLE
Investigating a Job Evaluation Instrument Through the Rasch Model

ABSTRACT
The Rasch measurement model was used to examine the psychometric properties of a job evaluation instrument. Fourteen job evaluators provided ratings on a sample of 143 jobs using the Factor Evaluation System. Results supported the job evaluation of the current job hierarchy, but modifications to the FES might be warranted.

PRESS PARAGRAPH
Issues of gender disparity in wages has spawned a renewed interest in objectively determining the intrinsic worth of jobs. This issue is important to the federal government and it has developed a standardized approach to evaluate jobs. This study investigated the effectiveness and utility of the Factor Evaluation System (FES) in an applied setting. Fourteen job evaluation specialists evaluated 143 jobs using the FES. The results showed that the FES confirmed the existing classification structure; however, the format of the FES may require further refinement because raters were not able to differentiate mid-points of the abstract job evaluation scales.

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# Investigating a Job Evaluation Instrument Through the Rasch Model

Job evaluation (JE) is the process of determining the value of jobs in an organization (Brannick & Levine, 2001). JE relies extensively on the judgment of humans to determine the relative worth of jobs in a classification structure (Madigan, 1985). Formal JE studies are common in the public sector (Kovach & Millspaugh, 1990) and the driving force can be attributed to the Federal Equitable Pay Practices Act of 1988. This act directed federal agencies to determine the extent wages are affected by gender. Partly in response to this Act, the U.S. Civil Service Commission (1977) has adopted a standardized approach to evaluate jobs.

The Factor Evaluation System (FES) is one of a number of point-factor approaches to determine the intrinsic value of a job (Madigan, 1985). The principle characteristic of point factor approaches is the use of fixed rating scales to measure the degree that compensable factors correspond to jobs. Most approaches contain 7 to 15 verbally anchored factor scales that apply to a particular job family. Job evaluators assign points to the scale levels based upon judgments of the relative importance of each factor. Several studies have compared various point factor methods of JE including the FES (e.g., Madigan & Hoover, 1986). Collins and Muchinsky (1993) compared three methods of JE: the 8-factor Midwestern Industrial Management Association system, the 13-factor State of Iowa system, and the 9-dimension FES using a multitrait-multimethod framework. Whereas evidence supported the convergent validity of the three methods, an analysis of the rank-order valuing of jobs was inconsistent. Similarly, Madigan (1985) compared three JE methods: (1) the Position Analysis Questionnaire (McCormick, Mecham, & Jeanneret, 1977), (2) the State of Idaho system, and (3) a customized plan derived from the FES. He found that the three methods produced divergent job classification hierarchies in about 50% of the 20 jobs studied and concluded that JE techniques are deficient with respect

to determining the relative importance of all job worth dimensions and being free from measurement contamination. Madigan and Hoover (1986) compared two JE instruments, the FES and the PAQ, each scored several ways: (1) using subjective weights of the factors, (2) using statistically weighted composites of the factors, and (3) using equations based on the PAQ recommendations. The authors reported the largest correlation among methods to be .41 for methods (2) and (3). Further, the agreement rates for evaluating jobs ranged from 27 to 84 percent. Despite the lack of agreement, the methods did converge with conclusions of gender pay discrimination.

Other studies about the measurement properties of JE have supported the reliability of the methods. Gomez-Mejia, Page, and Tornow (1982) reported interrater reliability coefficients in the range of .72 to .80. Using an intraclass correlation coefficient statistic, Madigan (1985) reported rater pair reliability above .85. Some studies (e.g., Doverspike, Carlisi, & Barrett, 1983; Fraser, Conshaw, & Alexander, 1984) have used generalizability theory (G-Theory) to assess rater reliability. A benefit of G-Theory is that sources of variance can be partitioned to examine the effects of raters, job evaluation factors, and jobs. Findings from G-Theory studies have supported the reliability of the methods.

Although the results indicated that JE ratings can be reliable, Huber (1991) argued that consistency in judgments can be attributed to the compensable factor being rated. Specifically, factors that contain concrete anchors (e.g., 1, 2, or 3 years of experience) should produce more consistent judgments than factors that contain descriptive adjectives (e.g., some, moderate, or extensive). Her research indicated that rating differences were minimal when the judgments were based on concrete judgment cues. Specifically, the interrater reliability for a factor with concrete anchors was .74; whereas, the reliability of a more descriptive scale was .51. Disagreement

increased when abstract referents were used as the anchors. There are no other studies that have compared the effects that anchors (i.e., descriptors) have on the measurement properties of a JE instrument.

The purpose of this study is to examine the measurement properties of the FES. The FES is an important instrument to investigate because of its widespread use in the federal government and public sector settings (Heneman, 2002). As a further contribution to the research base examining the reliability and validity of JE methods, the focus of this study will be to (a) test the effectiveness of the FES to adequately portray an existing hierarchy of jobs and (b) determine how effectively the anchors (referred to as levels in the FES nomenclature) operate for each of the FES factors. The study will contribute to JE research through the use of the Rasch model to simultaneously examine the effects of job evaluators, jobs, factors, and factor levels.

Rating Scale Analysis. JE methods are inherently based on human judgments; as such, there is the potential for subjectivity and bias (Huber, 1991). The reliability of JE judgments, freedom from rater biases, and desirable psychometric performance of the instrument are among the major measurement issues in JE research (Madigan, 1985). Multifaceted Rasch measurement is one technique for investigating rater factors in JE studies. FACETS software (Linacre, 1996) is the predominant tool for investigating data in rating contexts (Lunz & Stahl, 1990; O'Neill & Lunz, 1997). With FACETS, job evaluations are examined based upon a number of facets in the setting. In JE research the facets include the factor being rated, the job being evaluated, the evaluator severity, and the number of levels for each factor. All facets are placed on the same logit measurement scale to facilitate interpretation of the contribution of each parameter. A benefit of the

Rasch approach over G-Theory is that the JE rating simultaneously accounts for a variety of parameters. The formula presented in Appendix A depicts the model.

Scale Anchors. Wright and Masters (1982) argued that the Rasch model is appropriate for examining rating scales because scales with varying response options can be converted onto the same logit scale and compared. In the Rasch rating scale model, each response category (i.e., anchor or level) can be thought of as a step. For a factor on a JE instrument, completing a step (i.e., endorsing a level) represents choosing that level over the preceding level. For example, a person choosing level-2 of a factor on a JE instrument is considered to have selected level-2 over level-1 (first step), but not level-4 over level-3. According to Wright and Masters (1982), the "steps" in a rating scale item are dictated by its anchors. For most JE methods the level descriptions and number of levels vary according to the factor and method being used (e.g., Collins & Muchinsky, 1993). For example, the number of levels for the FES varies from three to nine depending upon the factor. Regardless of the factor definition or number of levels, the relative difficulties (parameters) of the steps in each factor should not vary from job to job. In other words, the levels should increase in the probability of being endorsed as the degree of that job factor increases. The scale should operate according to its intended properties regardless of the object of measurement (i.e, the jobs). The model specifies the probability of person n responding in category x to item i as follows:

$$\pi_{nix} = \frac{\exp \sum_{j=0}^{x} \left[ \beta_n - \left( \delta_i + \tau_j \right) \right]}{\sum_{k=0}^{m} \exp \sum_{j=0}^{k} \left[ \beta_n - \left( \delta_i + \tau_j \right) \right]},$$

Similarly, the order of the anchors of the responses should conform to the ordering specified by the researcher. In this study, the JE scale (to be described in the Method section) contained eight factors with three to nine levels. In each case the levels are based on a hierarchy such that the

lowest level of the factor should be followed by the second lowest level, and so on. The formula presented above is used to create an average measure for each anchor. The average measure of the anchors should increase as the descriptors of the levels increase and the probability of each scale anchor should increase as the propensity to endorse increases. The Rasch model will be used to test the following:

**Hypothesis One**: The level definitions of the FES factors will perform in a hierarchical manner. The lowest level definition will be endorsed for low levels of the factor, followed by the next level for jobs possessing more of the factor, and so on.

**Hypothesis Two**: A hierarchy of jobs based on the Rasch JE ratings will more closely approximate the current classification structure hierarchy than a model not controlling for rater severity, factors, factor levels, and jobs.

## Methods

JE Data. The data were obtained from the job classification system (over 800 encumbered jobs) of a large state government. The current study was to examine possible gender inequity in a subset of jobs to represent the population of jobs. The random stratified sample consisted of 143 jobs that represented the full range of the state's grade distribution. The state's grade structure ranged from 9 to 28 (M = 17.2, S.D. = 3.71). Although the job's grade and the union representation were the major determinants of pay, this study focused only on grade assignment. Grade has been used as the dependent variable in other research because of the impact that bargaining units have on establishing actual pay rates through collective bargaining (Schwab, 1980). For each job, the state had developed a written job description that would parallel most of the FES factors. Two FES factors, physical demands and work environment, were dropped from the instrument because they were not addressed in the state's job descriptions.

JE Instrument**.** The JE instrument used to assign points to job classifications via job descriptions was a modified FES (Appendix B). The approach of reviewing job descriptions to assign JE points has been adopted in previous research (e.g., Huber, 1991). The FES was modified by dropping the physical demands and work environment factors because these factors were not addressed in the job descriptions and adding a supervision exercised factor for supervisory classifications.

Raters. The study used two teams of independent raters to examine the consistency of ratings. Grams and Schwab (1985) noted that direct bias through organizational job analysis practices can influence the valuing of jobs. Employing two teams of raters (one from the primary organization and a second from a confirmatory group) allowed for an examination of this phenomenon. Eight raters from the primary organization (PO) had an average of 4.62 years of JE experience (S.D. = 7.36). All eight raters were Caucasian; six were female and two were male. The confirmatory group (CG) raters averaged 1.9 years of JE experience (S.D. = 1.66). Four raters were Caucasian, one rater was Latino, and one rater was African American. Five of the raters were female and one was male.

Jobs. A benefit of the Rasch model is that objects of measurement (i.e., evaluators, jobs, and factors) can be calibrated on the same scale. In this study it was not feasible for raters to evaluate all 143 jobs. Therefore, to maximize the number of jobs being rated, and to investigate differences in rater judgments, the 143 jobs were spiraled through the raters to link the Rasch parameters. This approach is similar to the methodology used to equate tests through linking items. Three of the four PO teams evaluated 44 jobs, and one team evaluated 43 jobs. Each team evaluated 28 unique jobs with the remaining 16 jobs being common to one or more of the rater

teams. The CG then evaluated the 28 jobs that were common to one or more of the 4 PO rater teams.

Training Sessions. Job evaluator training has been shown to contribute to valid and reliable JE ratings (Hahn & Dipboye,1988). For this study, an eight-hour training was provided to the 8 PO and 6 CG raters. Two facilitators with Ph.D.'s in I/O psychology and extensive experience in JE trained the raters. Training consisted of a lecture delineating the process of JE, an introduction to the modified FES, descriptions of common rating errors, and a demonstration of the JE instrument. Consistent with the Hahn and Dipboye approach, a bulk of the training was devoted to explaining the modified FES followed by a series of exercises to acquaint the raters with the factors and the rating scales.

## Results

The FACETS program produces a number of graphical and tabular reports to examine the various facets of measurement. Model fit is assessed by examining the Root Mean Square Error (RMSE) for the model for each facet. For the 14 raters the data fit the model well (RMSE = .09). Rasch reliability indicates how different the raters are. The statistic is interpreted similar to the KR-20 and for raters, the reliability was high (.98). The model fit the jobs facet of measurement less well (RMSE = .35) but well within acceptable limits and the reliability of measurement for jobs was high (.96). Finally, the model also fit the data well for the factor facet of measurement (RMSE = .08) and the reliability was .99.

Scale Analysis. Each of the eight scales of the modified FES was assessed to determine if the levels functioned according to the proposed hierarchy. The FACETS program produces a variety of output to assess scale performance. The information produced includes the frequency counts for the times a level was endorsed, followed by the step calibrations and standard errors

for each step. The frequency counts provide information about how useful the levels were in obtaining information about the object of measurement. If an anchor (or level) is used infrequently it is contributing little information about the facet. In some cases too many anchors can cause noise among raters because their judgments are not as precise as the scale. To interpret the step calibrations, as the level of each factor increases, so should the value for the step calibration. Misordered steps can also suggest rater noise or inappropriate scale anchors. The FACETS program also produces figures that depict the probability curves for each anchor for each factor. Each anchor should become the most probabilistic at a given level of the factor. If a scale is performing correctly the probabilities should have equivalent amplitude and be ordered as intended. Table 1 and Figures 1 through 8 present the results for the eight factors and the

Insert Table 1 and Figures 1 Through 8 About Here

associated scale levels. For the Knowledge factor, the frequency counts indicate that level 9 of the factor was not endorsed by the raters for the 143 jobs. Level 9 requires "mastery of a professional field to generate and develop new hypotheses and theories" which the job evaluators did not consider to be evident in this population of jobs. The step calibrations demonstrate that the remaining eight anchors were appropriately ordered, ranging from –5.49 to 5.48. Figure 1 depicts a pattern of appropriate ordering and amplitude for levels 1, 2, 6, 7 and 8, but raters were apparently unable to effectively distinguish among the middle levels 3, 4, and 5. This pattern suggests that collapsing these mid-levels may be warranted. Inspection of the verbal descriptors presented in Appendix B shows subtle differences that raters may have had difficulty differentiating. The Supervisory Controls facet results show that raters used each level of the scale. The step calibrations show that the hierarchy of the scales was appropriate. Figure 2

depicts a better pattern of response amplitude than for Knowledge, but collapsing anchors for 2, 3 and 4 may be warranted. Review of the level descriptors in Appendix B again shows subtle differences. The Guidelines factor results show that all five levels were used by the raters and the anchors for the levels were appropriately ordered ranging from –3.5 to 2.64. Figure 3 shows that each level became the most probabilistic as the degree of that factor increased. All levels for the Complexity factor were used by the raters and functioned as intended. The step calibrations ranged from –4.49 to 3.96 indicating correct ordering. The probability curve in Figure 4 shows that each level became the most probabilistic but there appears to be evidence for collapsing the third level. Scope and Effect factor results show that each level was used by the job evaluators and that the anchors were appropriately ordered with step calibrations ranging from –3.36 to 2.83. As shown in Figure 5, each anchor became the most probabilistic; however, there may be some justification for collapsing or eliminating level 2 and level 5. The Personal Contacts factor contains four levels. One of the raters determined that a job did not possess any degree of personal contact and assigned a score of zero. As noted in Appendix B, there is no escape option when evaluating jobs and a level must be assigned which might be a shortcoming of the FES. The step calibrations and figure 6 show that the anchors did perform as intended. Each response became the most probabilistic, but level 2 had a lower amplitude than the others. As before, job evaluators may have had difficulty distinguishing differences among levels 2, 3, and 4. The Purpose of Contacts factor shows a similar pattern. Two raters did not assign points to the factor suggesting that an escape option may be needed. The levels were ordered as designed and Figure 7 shows that each anchor became the most probabilistic. Results suggest that evaluators were able to distinguish among the various levels. The Supervision Exercised results in Figure 8 show that job evaluators did use each level of the scale and that the anchors were ordered in an

appropriate hierarchy. The amplitude of the second level of this facet suggest that this anchor may not be needed.

Facet Comparison. The FACETS program also presents comparative information for raters, jobs, and factors because each facet of measurement is transformed to same unit of measurement. Table 2 shows the results for the three facets. As shown, the Supervision Exercised factor was

Insert Table 2 About Here

the most difficult for evaluators to endorse and the Personal Contacts factor was most likely factor to be endorsed. These results suggest a hierarchy of factors associated with more highly valued jobs. Specifically, jobs that have high levels of Supervision Exercised may achieve a higher place in a classification scheme. High levels of Guidelines, Scope and Effect, and Complexity would contribute to differences in the hierarchy, but to a lesser degree. The remaining factors, Knowledge Required, Purpose of Contacts, Personal Contacts, and Supervisory Controls were most likely to receive high levels for all jobs and serve to differentiate jobs at the lower levels.

The data for the raters depict an interesting pattern. Three of the raters from the CG were more severe in their ratings and used the higher levels of the factors less frequently. The PO evaluators on the other hand, endorsed higher levels of the factors more frequently with rater 4 and rater 8 being the most likely to assign high levels of the factors to jobs. Results could be explained by at least two possibilities: (1) the PO evaluators being more lenient in their evaluations or (2) the CG raters were not familiar with the entire classification structure to evaluate how the sampled jobs fell within the existing job hierarchy. Nine of the 14 job evaluators used the levels of the factors in a consistent patter. Specifically, three of the CG

evaluators (1, 3, and 4) and six of the PO evaluators (2, 3, 5, 6, 1, and 7) converged in their evaluations. The jobs column shows the hierarchy of jobs that controlled for the facets of job evaluators and factors. The number adjacent to the title is the current grade assignment. For example, Deputy Commissioner (Grade 28) was the highest evaluated job of the hierarchy. Division Director (Grade 24) and Economist II (Grade 20) were at the next level. The lowest level of the hierarchy was Library Assistant I (Grade 11), followed by Boat Officer I (Grade 13), Ferry Terminal Assistant (Grade 11), and Microfilm Equipment Operator I (Grade 10). There are some instances of jobs being overvalued in the hierarchy, such as Accounting Supervisor II (Grade 18) in a group of Cartographer II (Grade 15), Embalmer (Grade 14), and Project Assistant (Grade 16); and Systems Programmer IV (Grade 25) adjacent to Biometrician III (Grade 20), Health Program Manager II (Grade 19), and Biometrician II (Grade 19). There are also instances of jobs being undervalued such as Economist (Grade 20) receiving the same evaluation as Division Director (Grade 24); and Public Health Nurse IV (Grade 22) receiving the same job evaluation as Environment Microbiologist III (Grade 18), Health Facilities Surveyor II (Grade 20), and Records Analyst I (Grade 17). The results for the Accountant III, V, and IV show an interesting pattern. Accountant V (Grade 22) received a higher job evaluation than Accountant IV (Grade 20); however, Accountant III (Grade 18) received more points than the other two This result may be a function of different rater teams evaluating different sets of jobs. These results suggest that for jobs in a series, it may be easier to rank order jobs when rating the entire series. When judges are not able to anchor their judgments for a job within a series based on the other jobs, it may be more difficult to maintain the intended structure. The association between the current grade assignment and the Rasch JE score using the facets of jobs, raters, and factors was slightly greater ($r = .86$) than the association between the raw JE score and grade ($r =$

.83). The correlation between the Rasch JE score and the raw JE score was .97. The Meng, Rosenthal, and Rubin (1992) formulas for comparing correlated coefficients was used to test the differences between the two correlations. The correlations were not significantly different (Z = .52).

## Conclusions

The results indicated that the Rasch measurement model provides useful information about JE data. There was partial support for Hypothesis One: The order of the levels of the eight factors was appropriate and the step calibrations and the amplitudes of the anchors confirmed the level structure. However, there was also evidence that the FES scales may require revision. Specifically, mid-levels for the Knowledge Required, Degree of Supervisory Control, Complexity, Scope and Effect, Nature of Contacts, and Supervision Exercised may be candidates for elimination or collapsing into other levels. These findings bolster Huber's (1991) results such that abstract rating scales may cause difficulties for job evaluators. Apparently, raters are unable to reliably render fine-grained judgments for the abstract FES level descriptors.

The study also found that the hierarchy of jobs using the FES could be better approximated with the Rasch model. Consistent with the findings from Madigan (1985), different methods and statistical approaches can produce divergent hierarchies of jobs. Controlling for other facets of measurement provided a slightly improved hierarchy of jobs. This is especially true of idiosyncratic raters using abstract scale definitions. Although Hypothesis Two was not supported statistically, there are practical considerations of these findings that are worthwhile for job evaluation practitioners. Assigning an inappropriate wage to a job may have impact for internal equity, subsequent recruiting, and organizational finances. Controlling for idiosyncratic raters or faulty scales may improve the accuracy of JE conclusions.

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Table 1. Frequency Counts and Step Calibrations for the Eight FES Factor Scales

Factor 1: Knowledge Scale

| Level | Count | Percent | Cum. Percent | Step Calibration | S.E. |
|---|---|---|---|---|---|
| 1 | 7 | 1% | 1% | | |
| 2 | 45 | 9% | 10% | -4.36 | 0.43 |
| 3 | 58 | 11% | 21% | -1.85 | 0.2 |
| 4 | 80 | 15% | 36% | -1.06 | 0.16 |
| 5 | 90 | 17% | 53% | 0.01 | 0.14 |
| 6 | 154 | 29% | 83% | 0.45 | 0.13 |
| 7 | 76 | 14% | 97% | 2.53 | 0.14 |
| 8 | 16 | 3% | 100% | 4.29 | 0.29 |
| 9 | 0 | 0% | 0% | | |

Factor 2: Supervisory Controls

| Level | Count | Percent | Cum. Percent | Step Calibration | S.E. |
|---|---|---|---|---|---|
| 1 | 16 | 3% | 3% | | |
| 2 | 92 | 17% | 21% | -3.19 | 0.29 |
| 3 | 135 | 26% | 46% | -0.56 | 0.15 |
| 4 | 191 | 36% | 83% | 0.77 | 0.12 |
| 5 | 92 | 17% | 100% | 2.99 | 0.14 |

Factor 3: Guidelines

| Level | Count | Percent | Cum. Percent | Step Calibration | S.E. |
|---|---|---|---|---|---|
| 1 | 38 | 7% | 7% | | |
| 2 | 170 | 32% | 40% | -3.5 | 0.2 |
| 3 | 190 | 36% | 76% | -0.6 | 0.12 |
| 4 | 92 | 17% | 93% | 1.46 | 0.13 |
| 5 | 36 | 7% | 100% | 2.64 | 0.2 |

Factor 4: Complexity

| Level | Count | Percent | Cum. Percent | Step Calibration | S.E. |
|---|---|---|---|---|---|
| 1 | 13 | 2% | 2% | | |
| 2 | 106 | 20% | 23% | -4.49 | 0.31 |
| 3 | 125 | 24% | 46% | -1.25 | 0.14 |
| 4 | 182 | 35% | 81% | -0.21 | 0.12 |
| 5 | 85 | 16% | 97% | 1.99 | 0.14 |
| 6 | 15 | 3% | 100% | 3.96 | 0.29 |

Table 1. Continued.

Factor 5: Scope and Effect

| Level | Count | Percent | Cum. Percent | Step Calibration | S.E. |
|---|---|---|---|---|---|
| 1 | 28 | 5% | 5% | | |
| 2 | 74 | 14% | 19% | -3.36 | 0.24 |
| 3 | 194 | 37% | 56% | -2.07 | 0.15 |
| 4 | 145 | 28% | 84% | 0.48 | 0.12 |
| 5 | 58 | 11% | 95% | 2.11 | 0.15 |
| 6 | 27 | 5% | 100% | 2.83 | 0.24 |

Factor 6: Personal Contacts

| Level | Count | Percent | Cum. Percent | Step Calibration | S.E. |
|---|---|---|---|---|---|
| 0 | 1 | 0% | 0% | | |
| 1 | 100 | 19% | 19% | -6.16 | 1.02 |
| 2 | 165 | 31% | 51% | -0.5 | 0.14 |
| 3 | 243 | 46% | 97% | 1.13 | 0.11 |
| 4 | 17 | 3% | 100% | 5.53 | 0.27 |

Factor 7: Purpose of Contacts

| Level | Count | Percent | Cum. Percent | Step Calibration | S.E. |
|---|---|---|---|---|---|
| 0 | 2 | 0% | 0% | | |
| 1 | 120 | 23% | 23% | -5.67 | 0.73 |
| 2 | 229 | 44% | 67% | -0.53 | 0.13 |
| 3 | 139 | 26% | 93% | 2.1 | 0.12 |
| 4 | 36 | 7% | 100% | 4.1 | 0.2 |

Factor 8: Supervision Exercised

| Level | Count | Percent | Cum. Percent | Step Calibration | S.E. |
|---|---|---|---|---|---|
| 1 | 90 | 64% | 64% | | |
| 2 | 37 | 26% | 90% | -0.64 | 0.21 |
| 3 | 14 | 10% | 100% | 0.64 | 0.33 |

Table 2. Modeled Facets of FES Factors, Job Evaluators, and Jobs Using the Logit Scale.

| Logit Measure | Factors | Job Evaluators | Job Titles | | | |
|---|---|---|---|---|---|---|
| 5 | | | | | | |
| | | | Deputy Commissioner 28 | | | |
| 4 | | | | | | |
| | | | Division Director 24 | Economist II 20 | | |
| 3 | | | | | | |
| | | | Health & Social Services Planner III 21 | Labor Relations Specialist III 21 | Operations Research Analyst I 21 | |
| | Supervision Exercised | | Administrative Services Manager 23 | Environmental Specialist IV 20 | Fish & Game Regional Supervisor 22 | Geologist V 22 |
| 2 | | | Attorney IV 24 | Environmental Engineer II 22 | Geologist IV 20 | Mental Health Clinician III 21 |
| | | | Vessel Construction Manager II 22 | | | |
| | | | Administrative Manager IV 21 | Fishery Biologist III 18 | Natural Resource Manager III 22 | Planner III 19 |
| | | | Vocational Rehabilitation Counselor II 18 | Vocational Rehabilitation Counselor III 19 | Wildlife Biologist III 18 | |
| | | | Biometrician III 20 | Health Program Manager II 19 | Leasing Officer III 18 | Public Health Nurse V 23 |
| | | | Systems Programmer Iv 25 | | | |
| | | CG5 | Biometrician II 19 | Community Development Specialist III 18 | Deputy Fire Marshal II 21 | Engineer/Architect III 24 |
| | | | Human Rights Field Representative IV 20 | Juvenile Probation Officer IV 19 | Major Public Safety 24 | Program Budget Analyst IV 21 |
| | | | Project Coordinator 18 | Systems Programmer III 23 | Utility Tariff Analyst II 17 | |
| 1 | | CG2 | Assistant Director | Boat Officer IV 19 | Data Processing Manager I 22 | Environmental Analyst III 19 |
| | | | Environmental Microbiologist III 18 | Health Facilities Surveyor II 20 | Human Resources Manager II 20 | Public Assistance Field Services Mgr I 19 |
| | | | Public Health Nurse IV 22 | Records Analyst I 17 | Right-Of-Way Agent IV 20 | Utility Engineering Analyst III 19 |
| | | CG6 | Accountant III 18 | Assistant Correctional Superintendent 19 | Data Processing Manager III 24 | Engineering Geologist II 18 |
| | | | Psychological Counselor II 17 | Program Coordinator 20 | | |
| | | | Accountant V 22 | Attorney III 22 | Claims Administrator 19 | Insurance Financial Examiner I 19 |
| | | | Natural Resource Officer II 16 | Personnel Officer II 20 | Personnel Specialist II 18 | Transportation Planner I 21 |
| | Guidelines, Scope and Effect | PO2 PO3 CG1 CG3 | Accountant IV 20 | Captain Public Safety 23 | Education Specialist II 21 | Environmental Engineer I 21 |
| | | | Environmental Health Officer 16 | Health Facilities Surveyor I 18 | Public Health Nurse III 21 | Weights & Measures Inspector II 16 |
| 0 | Complexity | PO5 | Adult Probation Officer II 16 | Aircraft Rescue & Firefight Specialist IV 14 | Correctional Ind Production Mgr II 18 | Human Rights Field Representative III 18 |
| | | | Investigator II 16 | Latent Fingerprint Examiner III 17 | Park Ranger II 16 | Recreation Therapist II 16 |

| Logit Measure | Factors | Job Evaluators | Job Titles | | | |
|---|---|---|---|---|---|---|
| | | | Regulations Specialist II 16 | | | |
| | | PO6 CG4 | Administrative Manager I 15 | Contracting Officer III 19 | Child Support Specialist II 16 | Eligibility Technician IV 16 |
| | | | Museum Specialist II 15 | Nurse III 18 | | |
| | Knowledge Required by the Position | PO1 PO7 | Employment Security Specialist III 16 | Engineering Assistant III 20 | Environmental Specialist II16 | Equipment Operations Analyst 18 |
| | | | Food Services Supervisor 16 | Medical Assistance Administrator II 18 | Passenger Services Inspector 17 | Tax Technician IV 16 |
| | | | Transportation Maint. Manager II 20 | | | |
| | Purpose of Contacts , Supervisory Controls | PO4 PO8 | Agronomist I 16 | Fish & Game Regional Prog Assistant 14 | Fishery Biologist I 14 | Insurance Analyst II 16 |
| -1 | Personal Contacts | | Aircraft Rescue & Firefighti Spec III 13 | Criminal Justice Technician II 14 | Education Specialist I 19 | Labor Economist I 14 |
| | | | Project Assistant 16 | | | |
| | | | Accounting Supervisor II 18 | Cartographer II 15 | Child Support Specialist I 14 | Consumer Protection & Info. Off I 14 |
| | | | Embalmer 14 | Information Officer I 14 | Psychiatric Nurse Assistant IV 14 | Recorder IV 14 |
| | | | Comm Vehicle Enforcement Officer II 14 | Employment Security Specialist II 15 | Radio Dispatcher II 12 | |
| | | | Accounting Technician II 14 | Amya Senior Team Leader 15 | Aircraft Rescue & Firefight Specialist II 12 | Correctional Officer II 13 |
| | | | Employment Security Specialist II 14 | Pfd Unit Supervisor 15 | Publications Technician II 13 | Social Worker I (Children's Services) 14 |
| -2 | | | Executive Secretary II 14 | Forest Technician III 11 | | |
| | | | Administrative Clerk III 10 | Accounting Technician I 12 | Insurance Analyst I 13 | Recorder III 12 |
| | | | Administrative Supervisor 12 | Ferry Services Manager II 14 | Supply Technician I 10 | |
| | | | Library Assistant II 13 | Retirement & Benefits Technician II 12 | Security Guard I 9 | Vocational Rehabilitation Assistant I 10 |
| -3 | | | Emergency Management Assistant 12 | Mail Services Lead Courier 10 | | |
| | | | Ferry Terminal Assistant 12 | Microfilm Equipment Operator I 10 | | |
| -4 | | | Boat Officer I 13 | | | |
| -5 | | | Library Assistant I 11 | | | |
| -6 | | | | | | |

Figures 1 through 8: Category Probabilities for the Eight FES Scales

Figure 1. Probability Curves for Knowledge Required Factor

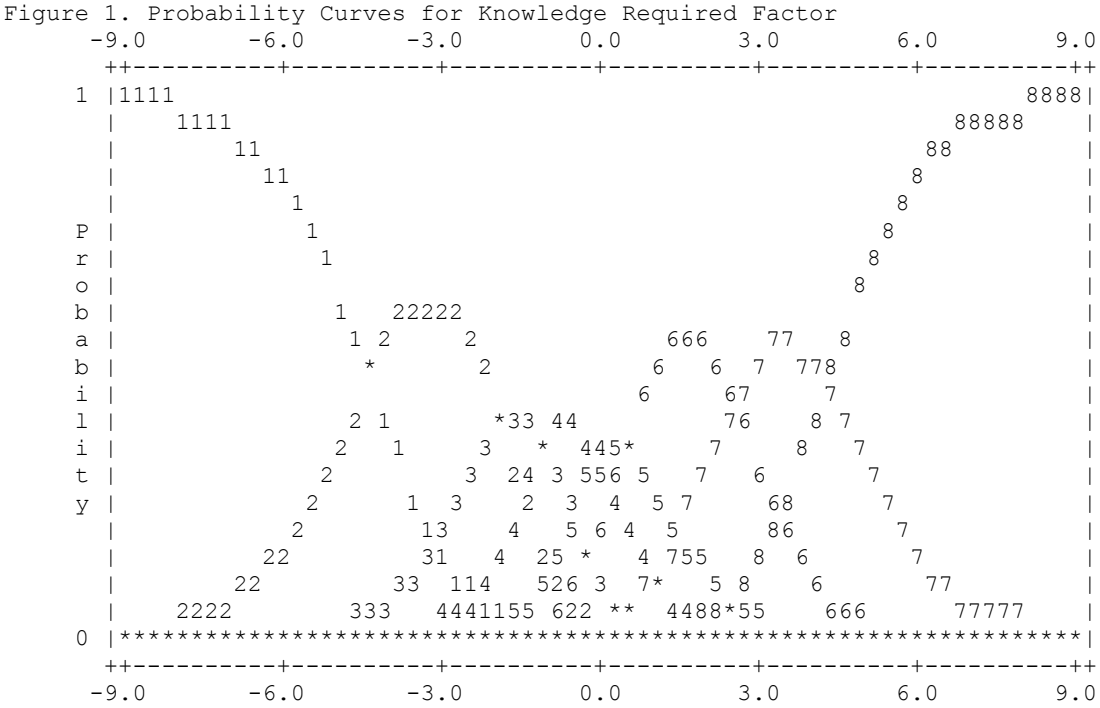


Figure 2. Probability Curves for Degree of Supervisory Control Factor

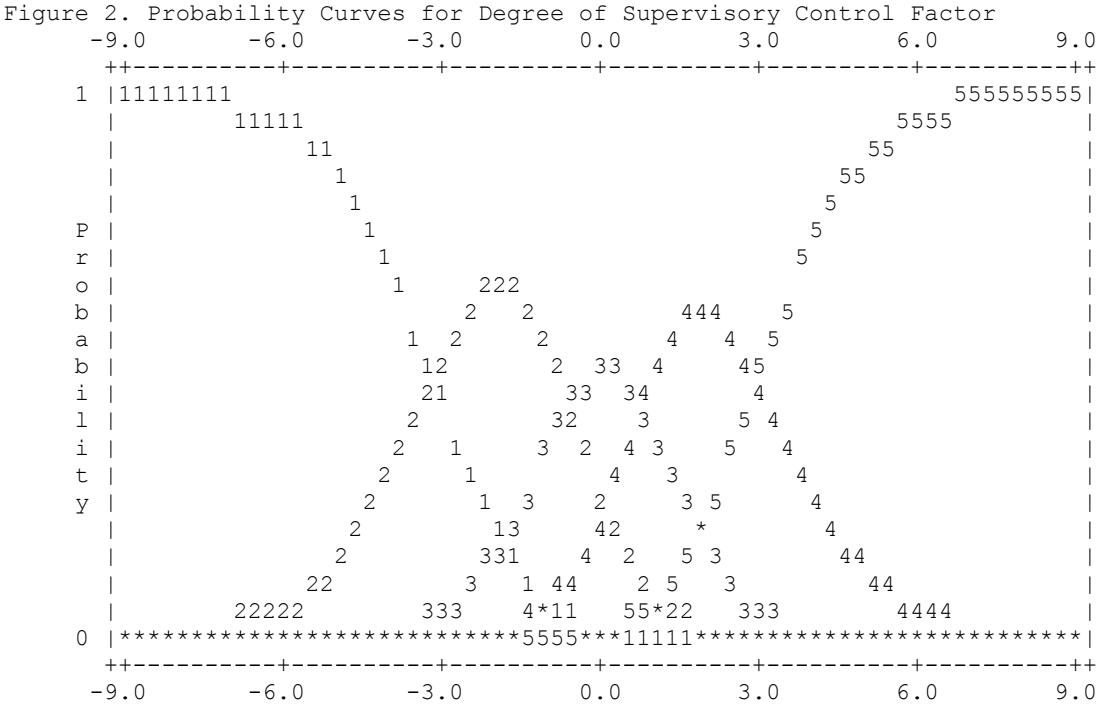

Figure 3. Probability Curves for Guidelines Factor

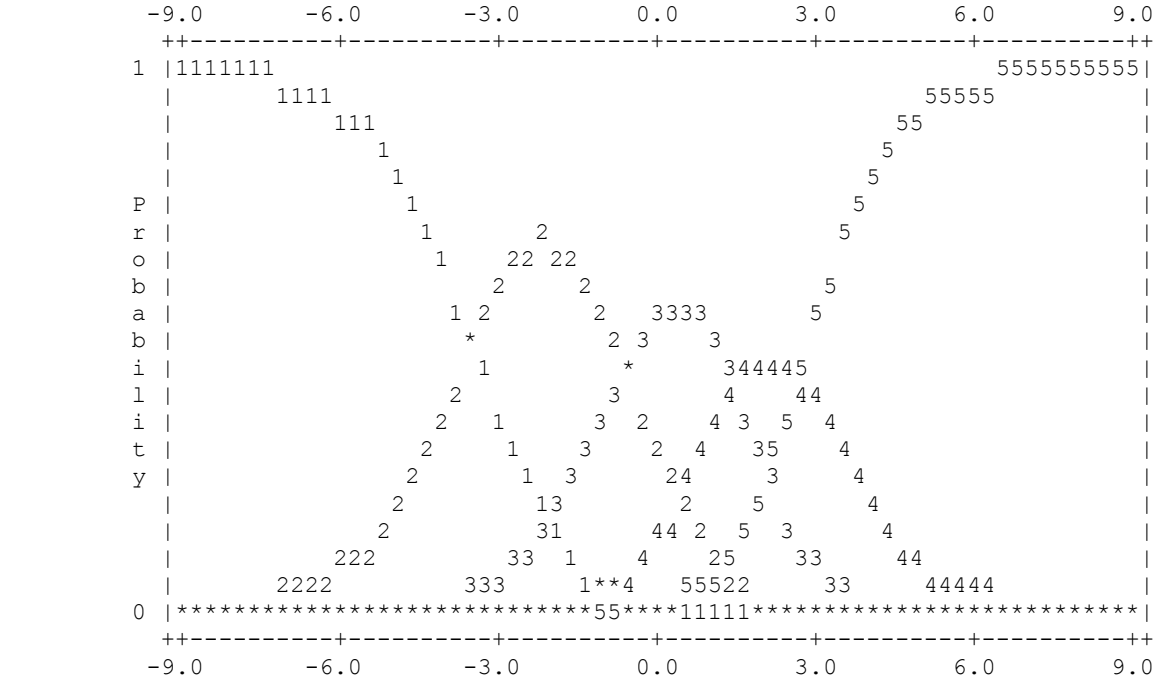


Figure 4. Probability Curves for Complexity Factor

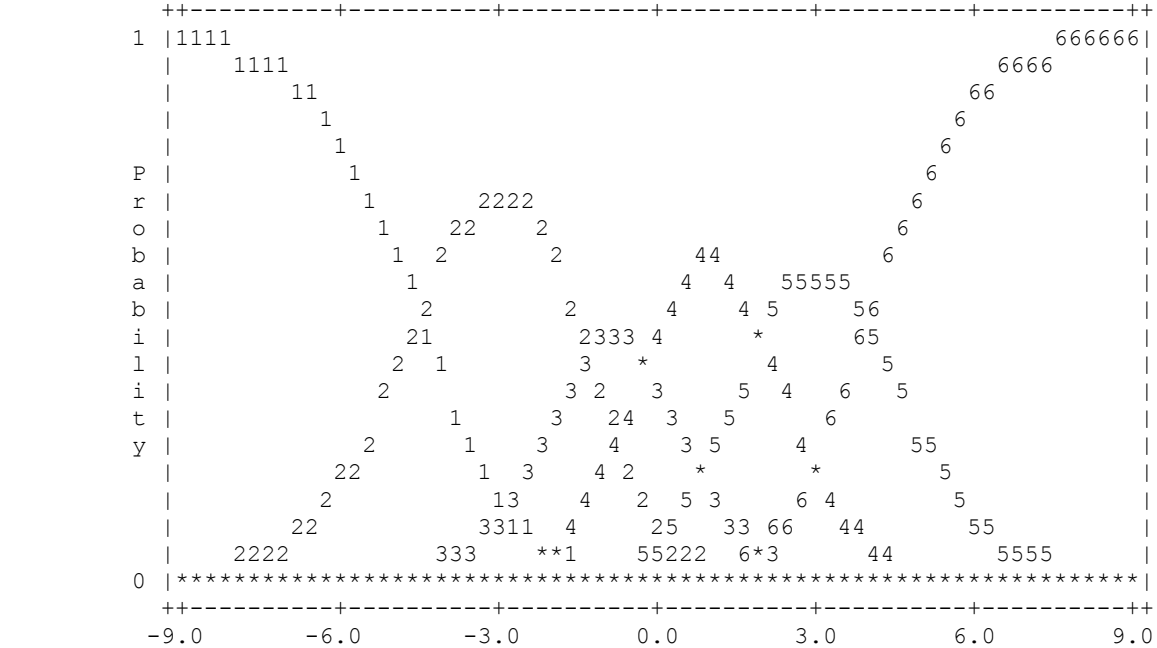

Figure 5. Probability Curves for Scope Factor

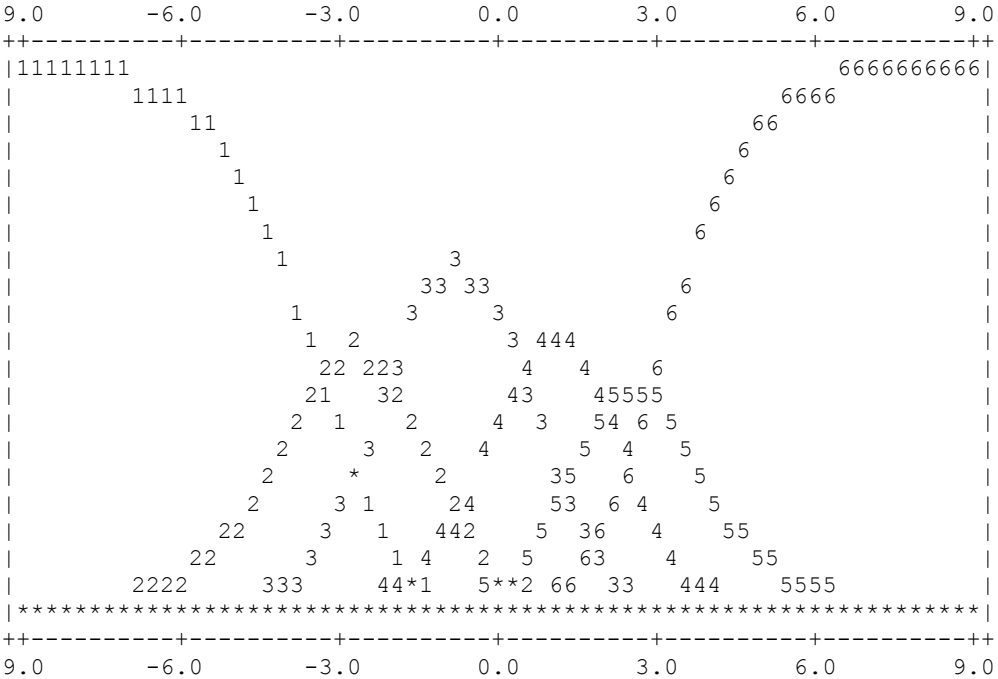


Figure 6. Probability Curves for Nature of Contacts Factor

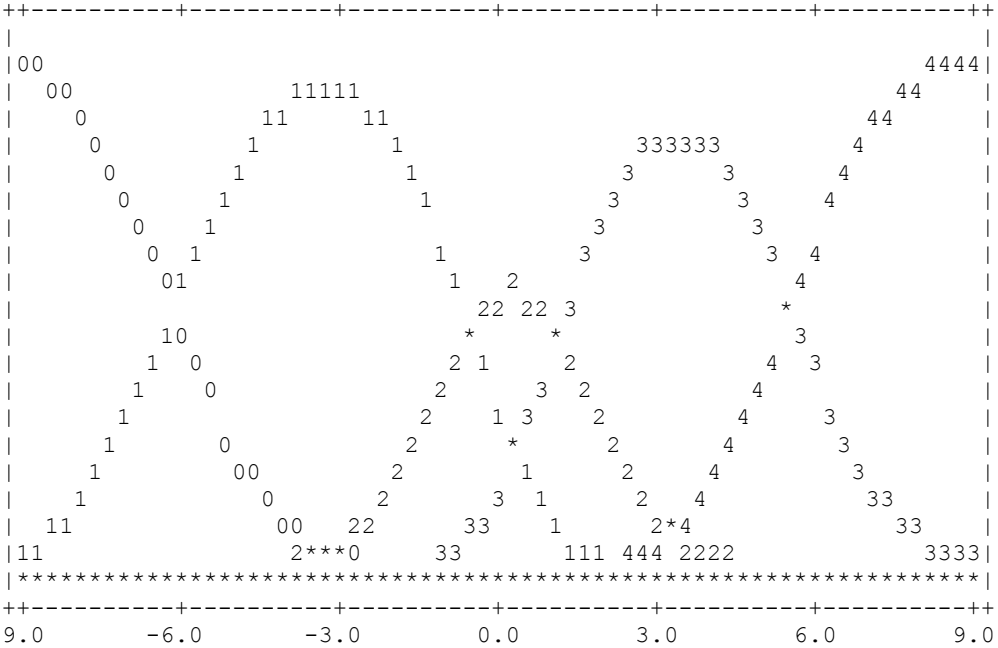

Figure 7. Probability Curves for Purpose of Contacts Factor

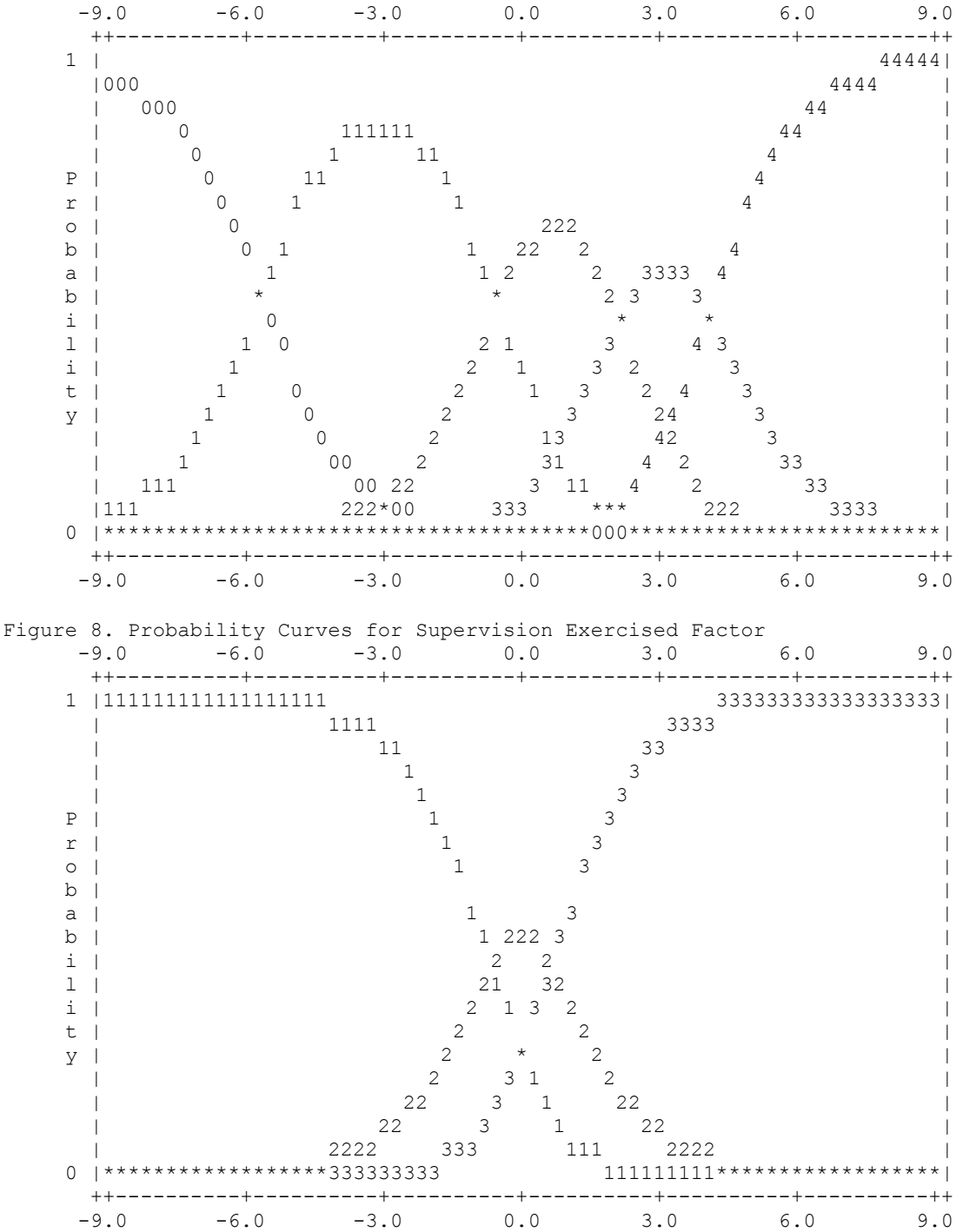


Figure 8. Probability Curves for Supervision Exercised Factor

Appendix A: Rasch Rating Scale Model

$$Log\left(\frac{P_{nijok}}{P_{nijo\ (k-1)}}\right) = B_n - D_i - C_j - T_o - F_k$$

Here, $P_{nijok}$ is the probability of job *n*, when rated on factor *i* by judge *j* in occasion *o*, being awarded a rating of level *k;* $P_{nijo(k-1)}$ is the probability of job *n*, when rated on factor *i* by judge *j* in occasion *o*, being awarded a rating of level *k-1*; $B_n$ is the "ability" of job *n*; $D_i$ is the "difficulty" of factor *i*; $C_j$ is the severity of judge *j*; $T_o$ is the stringency of occasion *o*; and $F_k$ is the extra difficulty overcome in being observed at the rating level *k* relative to the rating level *k-1*. The "ability" and "difficulty" are typically used in rating scale research for performance-based assessments. However, for this study, "ability" can be thought of as intrinsic job worth and "difficulty" can be thought of as the propensity to endorse a job evaluation factor. Lunz and Stahl (1990) provided an example of using this interpretation in their analysis of job analysis rating scale performance.

Appendix B. Factor Definitions and Scale Levels

# FACTOR 1 -- KNOWLEDGE REQUIRED BY THE POSITION

Factor 1 measures the nature and extent of information or facts that a worker must understand to do acceptable work, e.g., steps, procedures, practices, rules, policies, theories, principles, and concepts, and the nature and extent of the skills needed to apply this knowledge. To be used as a basis for selecting a level under this factor, a knowledge must be required *and* applied.

**Level 1-1**
- Knowledge of simple, routine, or repetitive tasks or operations that typically include following step-by-step instructions and require little or no previous training or experience.
- Skill to operate simple equipment or equipment that operates repetitively, requiring little or no previous training or experience.

**Level 1-2**
- Knowledge of basic or commonly used rules, procedures, or operations that typically require some previous training or experience.
- Basic skill to operate equipment requiring some previous training or experience, such as keyboard equipment.

**Level 1-3**
- Knowledge of a body of standardized rules, procedures or operations that require considerable training and experience to perform the full range of standard clerical assignments and resolve recurring problems.
- Skill, acquired through considerable training and experience, to operate and adjust varied equipment for purposes such as performing numerous standardized tests or operations.

**Level 1-4**
- Knowledge of an extensive body of rules, procedures or operations that require extended training and experience to perform a wide variety of interrelated or nonstandard procedural assignments and resolve a wide range of problems.
- Practical knowledge of standard procedures in a technical field, requiring extended training or experience, to perform such work as adapting equipment when this requires consideration of the functioning characteristics of equipment; interpreting results of tests based on previous experience and observations (rather than directly reading instruments or other measures); or extracting information from various sources when this requires considering the applicability of information and the characteristics and quality of the sources.

**Level 1-5**
- Knowledge (such as would be acquired through a pertinent baccalaureate educational program or its equivalent in experience, training, or independent study) of basic principles, concepts, and methodology of a professional or administrative occupation, and skill in applying this knowledge in carrying out elementary assignments, operations, or procedures.

- In addition to the practical knowledge of standard procedures in Level 1-4, practical knowledge of technical methods to perform assignments such as carrying out limited projects that involves use of specialized complicated techniques.

**Level 1-6**

- Knowledge of the principles, concepts, and methodology of a professional or administrative occupation as described at Level 1-5 that has been either: (a) supplemented by skill gained through job experience to permit independent performance of recurring assignments, or (b) supplemented by expanded professional or administrative knowledge gained through relevant graduate study or experience, that has provided skill in carrying out assignments, operations, and procedures in the occupation that are significantly more difficult and complex than those covered by Level 1-5.
- Practical knowledge of a wide range of technical methods, principles, and practices similar to a narrow area of a professional field, and skill in applying this knowledge to such assignments as the design and planning of difficult, but well-precedented projects.

**Level 1-7**

- Knowledge of a wide range of concepts, principles, and practices of a professional or administrative occupation, such as would be gained through extended graduate study or experience, and skill in applying this knowledge to difficult and complex work assignments.
- A comprehensive, intensive, practical knowledge of a technical field, and skill in applying this knowledge to the development of new methods, approaches, or procedures.

**Level 1-8**

- Mastery of a professional or administrative field to:
  -- Apply experimental theories and new developments to problems not susceptible to treatment by accepted methods.
  -- Make decisions or recommendations significantly changing, interpreting, or developing important public policies or programs.

**Level 1-9**

- Mastery of a professional field to generate and develop new hypotheses and theories.

## FACTOR 2 -- SUPERVISORY CONTROLS

"Supervisory Controls" covers the nature and extent of direct or indirect controls exercised by the supervisor, the employee's responsibility, and the review of completed work. Controls are exercised by the supervisor in the way assignments are made, instructions are given to the employee, priorities and deadlines are set, and objectives and boundaries are defined. Responsibility of the employee depends upon the extent to which the employee is expected to develop the sequence and timing of various aspects of the work, to modify or recommend modification of instructions, and to participate in establishing priorities and defining objectives. The degree of review of completed work depends upon the nature and extent of the review, e. g., close and detailed review of each phase of the assignment; detailed review of the finished assignment; spot-check of finished work for accuracy, or review only for adherence to policy.

**Level 2-1**

- For both one-of-a-kind and repetitive tasks the supervisor makes specific assignments that are accompanied by clear, detailed, and specific instructions.
- The employee works as instructed and consults with the supervisor as needed on all matters not specifically covered in the original instructions or guidelines.
- For all positions the work is closely controlled. For some positions, the control is through the structured nature of the work itself; for others, it may be controlled by the circumstances in which it is performed. In some situations, the supervisor maintains control through review of the work. This may include checking progress or reviewing completed work for accuracy, adequacy, and adherence to instructions and established procedures.

**Level 2-2**

- The supervisor provides continuing or individual assignments by indicating generally what is to be done, limitations, quality and quantity expected, deadlines, and priority of assignments. The supervisor provides additional, specific instructions for new, difficult, or unusual assignments, including suggested work methods or advice on source material available.
- The employee uses initiative in carrying out recurring assignments independently without specific instruction, but refers deviations, problems, and unfamiliar situations not covered by instructions to the supervisor for decision or help.
- The supervisor assures that finished work and methods used are technically accurate and in compliance with instructions or established procedures. Review of the work increases with more difficult assignments if the employee has not previously performed similar assignments.

**Level 2-3**

- The supervisor makes assignments by defining objectives, priorities, and deadlines; and assists the employee with unusual situations that do not have clear precedents.
- The employee plans and carries out the successive steps and handles problems and deviations in the work assignment in accordance with instructions, policies, previous training, or accepted practices in the occupation.
- Completed work is usually evaluated for technical soundness, appropriateness, and conformity to policy and requirements. The methods used in arriving at the end results are not usually reviewed in detail.

**Level 2-4**

- The supervisor sets the overall objectives and resources available. The employee and supervisor, in consultation, develop the deadlines, projects, and work to be done.
- The employee, having developed expertise in the line of work, is responsible for planning and carrying out the assignment, resolving most of the conflicts that arise, coordinating the work with others as necessary, and interpreting policy on own initiative in terms of established objectives. In some assignments, the employee also determines the approach to be taken and the methodology to be used. The employee keeps the supervisor informed of progress and potentially controversial matters.
- Completed work is reviewed only from an overall standpoint in terms of feasibility, compatibility with other work, or effectiveness in meeting requirements or expected results.

**Level 2-5**

- The supervisor provides administrative direction with assignments in terms of broadly defined missions or functions.
- The employee has responsibility for independently planning, designing, and carrying out programs, projects, studies, or other work.
- Results of the work are considered technically authoritative and are normally accepted without significant change. If the work should be reviewed, the review concerns such matters as fulfillment of program objectives, effect of advice and influence on the overall program, or the contribution to the advancement of technology. Recommendations for new projects and alteration of objectives usually are evaluated for such considerations as availability of funds and other resources, broad program goals, or national priorities.

## FACTOR 3 -- GUIDELINES

This factor covers the nature of guidelines and the judgment needed to apply them. Guides used in General Schedule occupations include, for example, desk manuals, established procedures and policies, traditional practices, and reference materials such as dictionaries, style manuals, engineering handbooks, and the pharmacopoeia.

Individual jobs in different occupations vary in the specificity, applicability and availability of the guidelines for performance of assignments. Consequently, the constraints and judgmental demands placed upon employees also vary. For example, the existence of specific instructions, procedures, and policies may limit the employee's opportpointy to make or recommend decisions or actions. However, in the absence of procedures or under broadly stated objectives, employees in some occupations may use considerable judgment in researching literature and developing new methods.

Guidelines should not be confused with the knowledge described under Factor 1, Knowledge Required by the Position. Guidelines either provide reference data or impose certain constraints on the use of knowledge. For example, in the field of medical technology, for a particular diagnosis there may be three or four standardized tests set forth in a technical manual. A medical technologist is expected to know these diagnostic tests. However, in a given laboratory the policy may be to use only one of the tests; or the policy may state specifically under what conditions one or the other of these tests may be used.

**Level 3-1**

- Specific, detailed guidelines covering all-important aspects of the assignment are provided to the employee.
- The employee works in strict adherence to the guidelines; deviations must be authorized by the supervisor.

**Level 3-2**

- Procedures for doing the work have been established and a number of specific guidelines are available.

- The number and similarity of guidelines and work situations require the employee to use judgment in locating and selecting the most appropriate guidelines, references, and procedures for application and in making minor deviations to adapt the guidelines to specific cases. The employee may also determine which of several established alternatives to use. Situations to which the existing guidelines cannot be applied or significant proposed deviations from the guidelines are referred to the supervisor.

**Level 3-3**
- Guidelines are available, but are not completely applicable to the work or have gaps in specificity.
- The employee uses judgment in interpreting and adapting guidelines such as agency policies, regulations, precedents, and work directions for application to specific cases or problems. The employee analyzes results and recommends changes.

**Level 3-4**
- Administrative policies and precedents are applicable but are stated in general terms. Guidelines for performing the work are scarce or of limited use.
- The employee uses initiative and resourcefulness in deviating from traditional methods or researching trends and patterns to develop new methods, criteria, or proposed new policies.

**Level 3-5**
- Guidelines are broadly stated and nonspecific, e.g., broad policy statements and basic legislation that require extensive interpretation.
- The employee must use judgment and ingenuity in interpreting the intent of the guides that do exist and in developing applications to specific areas of work. Frequently, the employee is recognized as a technical authority in the development and interpretation of guidelines.

## FACTOR 4 -- COMPLEXITY

This factor covers the nature, number, variety, and intricacy of tasks, steps, processes, or methods in the work performed; the difficulty in identifying what needs to be done; and the difficulty and originality involved in performing the work.

**Level 4-1**
- The work consists of tasks that are clear-cut and directly related.
- There is little or no choice to be made in deciding what needs to be done.
- Actions to be taken or responses to be made are readily discernible. The work is quickly mastered.

**Level 4-2**
- The work consists of duties that involve related steps, processes, or methods.
- The decision regarding what needs to be done involves various choices that require the employee to recognize the existence of and differences among a few easily recognizable situations.

- Actions to be taken or responses to be made differ in such things as the source of information, the kind of transactions or entries, or other differences of a factual nature.

**Level 4-3**
- The work includes various duties involving different and unrelated processes and methods.
- The decision regarding what needs to be done depends upon the analysis of the subject, phase, or issues involved in each assignment, and the chosen course of action may have to be selected from many alternatives.
- The work involves conditions and elements that must be identified and analyzed to discern interrelationships.

**Level 4-4**
- The work typically includes varied duties that require many different and unrelated processes and methods such as those relating to well-established aspects of an administrative or professional field.
- Decisions regarding what needs to be done include the assessment of unusual circumstances, variations in approach, and incomplete or conflicting data.
- The work requires making many decisions concerning such things as interpretation of considerable data, planning of the work, or refinement of the methods and techniques to be used.

**Level 4-5**
- The work includes varied duties requiring many different and unrelated processes and methods that are applied to a broad range of activities or substantial depth of analysis, typically for an administrative or professional field.
- Decisions regarding what needs to be done include major areas of uncertainty in approach, methodology, or interpretation and evaluation processes that result from such elements as continuing changes in program, technological developments, unknown phenomena, or conflicting requirements.
- The work requires originating new techniques, establishing criteria, or developing new information.

**Level 4-6**
- The work consists of broad functions and processes of an administrative or professional field. Assignments are characterized by breadth and intensity of effort and involve several phases pursued concurrently or sequentially with the support of others within or outside of the organization.
- Decisions regarding what needs to be done include largely undefined issues and elements and require extensive probing and analysis to determine the nature and scope of the problems.
- The work requires continuing efforts to establish concepts, theories, or programs, or to resolve unyielding problems.

## FACTOR 5 -- SCOPE AND EFFECT

"Scope and Effect" covers the relationship between the nature of the work, i.e., the purpose, breadth, and depth of the assignment, and the effect of work products or services both within and outside the organization.

In General Schedule occupations, effect measures such things as whether the work output facilitates the work of others, provides timely services of a personal nature, or impacts on the adequacy of research conclusions. The concept of effect alone does not provide sufficient information to properly understand and evaluate the impact of the position. The scope of the work completes the picture and allows consistent evaluations. Only the effect of properly performed work is to be considered.

**Level 5-1**

- The work involves the performance of specific, routine operations that include a few separate tasks or procedures.
- The work product or service is required to facilitate the work of others; however, it has little impact beyond the immediate organizational point or beyond the timely provision of limited services to others.

**Level 5-2**

- The work involves the execution of specific rules, regulations, or procedures and typically comprises a complete segment of an assignment or project of broader scope.
- The work product or service affects the accuracy, reliability, or acceptability of further processes or services.

**Level 5-3**

- The work involves treating a variety of conventional problems, questions, or situations in conformance with established criteria.
- The work product or service affects the design or operation of systems, programs, or equipment; the adequacy of such activities as field investigations, testing operations, or research conclusions; or the social, physical, and economic well being of people.

**Level 5-4**

- The work involves establishing criteria; formulating projects; assessing program effectiveness; or investigating or analyzing a variety of unusual conditions, problems, or questions.
- The work product or service affects a wide range of agency activities, major activities or industrial concerns, or the operation of other agencies.

**Level 5-5**

- The work involves isolating and defining unknown conditions, resolving critical problems, or developing new theories.
- The work product or service affects the work of other experts, the development of major aspects of administrative or scientific programs or missions, or the well being of substantial numbers of people.

**Level 5-6**

- The work involves planning, developing, and carrying out vital administrative or scientific programs.
- The programs are essential to the missions of the agency or affect large numbers of people on a long-term or continuing basis.

## FACTOR 6 -- PERSONAL CONTACTS

This factor includes face-to-face contacts and telephone and radio dialogue with persons not in the supervisory chain. (NOTE: Personal contacts with supervisors are covered under Factor 2, Supervisory Controls.) Levels described under this factor are based on what is required to make the initial contact, the difficulty of communicating with those contacted, and the setting in which the contacts take place (e.g., the degree to which the employee and those contacted recognize their relative roles and authorities).

Above the lowest level, points should be credited under this factor only for contacts that are essential for successful performance of the work and that have a demonstrable impact on the difficulty and responsibility of the work performed.

The relationship of Factors 6 and 7 presumes that the same contacts will be evaluated for both factors. Therefore, use the personal contacts that serve as the basis for the level selected for Factor 7 as the basis for selecting a level for Factor 6.

**Level 6-1**

- The personal contacts are with employees within the immediate organization, office, project, or work point, and in related or support points.
- The contacts are with members of the general public in very highly structured situations, e.g., the purpose of the contact and the question of with whom to deal are relatively clear. Typical of contacts at this level are purchases of admission tickets at a ticket window.

**Level 6-2**

- The personal contacts are with employees in the same agency, but outside the immediate organization. People contacted generally are engaged in different functions, missions, and kinds of work, e.g., representatives from various levels within the agency, such as headquarters, regional, district, or field offices, or other operating offices at the immediate installation.
- The contacts are with members of the general public, as individuals or groups, in a moderately structured setting. For example, the contacts generally are established on a routine basis, usually at the employee's work place; the exact purpose of the contact may be unclear at first to one or more of the parties; and one or more of the parties may be uninformed concerning the role and authority of other participants. Typical of contacts at this level are those with persons seeking airline reservations or with job applicants at a job information center.

**Level 6-3**

- The personal contacts are with individuals or groups from outside the employing agency in a moderately unstructured setting. For example, the contacts are not established on a routine basis; the purpose and extent of each contact is different; and the role and authority of each party is identified and developed during the course of the contact. Typical of contacts at this level are those with people in their capacities as attorneys; contractors; or representatives of professional organizations, the news media, or public action groups.

**Level 6-4**

- The personal contacts are with high-ranking officials from outside the employing agency at national or international levels in highly unstructured settings, e.g., contacts are characterized by problems such as, the officials may be relatively inaccessible; arrangements may have to be made for accompanying staff members; appointments may have to be made well in advance; each party may be very unclear as to the role and authority of the other; and each contact may be conducted under different ground rules. Typical of contacts at this level are those with Members of Congress, leading representatives of foreign governments, presidents of large national or international firms, nationally recognized representatives of the news media, presidents of national unions, State governors, or mayors of large cities.

## FACTOR 7 -- PURPOSE OF CONTACTS

In General Schedule occupations, the purpose of personal contacts ranges from factual exchanges of information to situations involving significant or controversial issues and differing viewpoints, goals, or objectives. The personal contacts that serve as the basis for the level selected for this factor must be the same as the contacts that are the basis for the level selected for Factor 6.

**Level 7-1**

- The purpose is to obtain, clarify, or give facts or information regardless of the nature of those facts; i.e., the facts or information may range from easily understood to highly technical.

**Level 7-2**

- The purpose is to plan, coordinate, or advise on work efforts or to resolve operating problems by influencing or motivating individuals or groups who are working toward mutual goals and who have basically cooperative attitudes.

**Level 7-3**

- The purpose is to influence, motivate, interrogate, or control people or groups. The people contacted may be fearful, skeptical, uncooperative, or dangerous. Therefore, the employee must be skillful in approaching the individual or group in order to obtain the desired effect, such as gaining compliance with established policies and regulations by persuasion or negotiation, or gaining information by establishing rapport with a suspicious informant.

**Level 7-4**

- The purpose is to justify, defend, negotiate, or settle matters involving significant or controversial issues. The work usually involves active participation in conferences, meetings, hearings, or presentations involving problems or issues of considerable consequence or importance. The people contacted typically have diverse viewpoints, goals, or objectives requiring the employee to achieve a common understanding of the problem and a satisfactory solution by convincing them, arriving at a compromise, or developing suitable alternatives.

## FACTOR 8 – SUPERVISORY AND MANAGERIAL AUTHORITY EXERCISED

This factor covers the delegated supervisory and managerial authorities, which are exercised on a recurring basis. To be credited with a level under this factor, a position must meet the authorities and responsibilities to the extent described for the specific level. Levels under this factor apply equally to the direction of specialized program management organizations, line functions, staff functions, and operating and support activities. Where authority is duplicated or not significantly differentiated among several organizational levels, a factor level may apply to positions at more than one organizational level.

### Level 8-1

Positions at this level meet a or b or c below:

a. Plan and schedule ongoing production-oriented work on a quarterly and annual basis, or direct assignments of similar duration. Adjust staffing levels or work procedures within their organizational point(s) to accommodate resource allocation decisions made at higher echelons. Justify the purchase of new equipment. Improve work methods and procedures used to produce work products. Oversee the development of technical data, estimates, statistics, suggestions, and other information useful to higher-level managers in determining which goals and objectives to emphasize. Decide the methodologies to use in achieving work goals and objectives, and in determining other management strategies.

b. Where work is contracted out, perform a wide range of technical input and oversight tasks comparable to all or nearly all of the following:
   1. Analyze benefits and costs of accomplishing work in-house versus contracting; recommend whether to contract;
   2. Provide technical requirements and descriptions of the work to be accomplished;
   3. Plan and establish the work schedules, deadlines, and standards for acceptable work; coordinate and integrate contractor work schedules and processes with work of subordinates or others;
   4. Track progress and quality of performance; arrange for subordinates to conduct any required inspections;
   5. Decide on the acceptability, rejection, or correction of work products or services, and similar matters which may affect payment to the contractor.

c. Carry out at least three of the first four, and a total of six or more of the following 10 authorities and responsibilities:

1. Plan work to be accomplished by subordinates, set and adjust short-term priorities, and prepare schedules for completion of work;
2. Assign work to subordinates based on priorities, selective consideration of the difficulty and requirements of assignments, and the capabilities of employees;
3. Evaluate work performance of subordinates;
4. Give advice, counsel, or instruction to employees on both work and administrative matters;
5. Interview candidates for positions in the point; recommend appointment, promotion, or reassignment to such positions;
6. Hear and resolve complaints from employees, referring group grievances and more serious unresolved complaints to a higher level supervisor or manager;
7. Effect minor disciplinary measures, such as warnings and reprimands, recommending other action in more serious cases;

8. Identify development and training needs of employees, providing or arranging for needed development and training;
9. Find ways to improve production or increase the quality of the work directed;
10. Develop performance standards.

## Level 8-2

To meet this level, positions must meet paragraph a or b below:

a. Exercise delegated managerial authority to set a series of annual, multiyear, or similar types of long-range work plans and schedules for in-service or contracted work. Assure implementation (by lower and subordinate organizational points or others) of the goals and objective for the program segment(s) or function(s) they oversee. Determine goals and objectives that need additional emphasis; determine the best approach or solution for resolving budget shortages; and plan for long range staffing needs, including such matters as whether to contract out work. These positions are closely involved with high level program officials (or comparable agency level staff personnel) in the development of overall goals and objectives for assigned staff function(s), program(s), or program segment(s). For example, they direct development of goals and objectives related to high levels of program management and development formulation.

b. Exercise all or nearly all of the delegated supervisory authorities and responsibilities described at Level 8-1c of this factor and, in addition, at least 8 of the following:
   1. Using any of the following to direct, coordinate, or oversee work: supervisors, leaders, team chiefs, group coordinators, committee chairs, or comparable personnel; and/or providing similar oversight of contractors;
   2. Exercising significant responsibilities in dealing with officials of other points or organizations, or in advising management officials of higher rank;
   3. Assuring reasonable equity (among points, groups, teams, projects, etc.) of performance standards and rating techniques developed by subordinates or assuring comparable equity in the assessment by subordinates of the adequacy of contractor capabilities or of contractor completed work;
   4. Direction of a program or major program segment with significant resources (e.g., one at a multimillion dollar level of annual resources);

5. Making decisions on work problems presented by subordinate supervisors, team leaders, or similar personnel, or by contractors;
6. Evaluating subordinate supervisors or leaders and serving as the reviewing official on evaluations of nonsupervisory employees rated by subordinate supervisors;
7. Making or approving selections for subordinate nonsupervisory positions;
8. Recommending selections for subordinate supervisory positions and for work leader, group leader, or project director positions responsible for coordinating the work of others, and similar positions;
9. Hearing and resolving group grievances or serious employee complaints;
10. Reviewing and approving serious disciplinary actions (e.g., suspensions) involving nonsupervisory subordinates.
11. Making decisions on nonroutine, costly, or controversial training needs and training requests related to employees of the point;
12. Determining whether contractor performed work meets standards of adequacy necessary for authorization of payment;
13. Approving expenses comparable to within-grade increases, extensive overtime, and employee travel;
14. Recommending awards or bonuses for nonsupervisory personnel and changes in position classification, subject to approval by higher level officials, supervisors, or others;
15. Finding and implementing ways to eliminate or reduce significant bottlenecks and barriers to production, promote team building, or improve business practices.

## Level 8-3

In addition to delegated managerial and supervisory authorities included at lower levels of this factor, positions at this level meet the criteria in paragraph a or b below:

a. Exercise delegated authority to oversee the overall planning, direction, and timely execution of a program, several program segments (each of which is managed through separate subordinate organizational points), or comparable staff functions, including development, assignment, and higher level clearance of goals and objectives for supervisors or managers of subordinate organizational points or lower organizational levels. Approve multiyear and longer-range work plans developed by the supervisors or managers of subordinate organizational points and subsequently manage the overall work to enhance achievement of the goals and objectives. Oversee the revision of long range plans, goals, and objectives for the work directed. Manage the development of policy changes throughout the organization directed, or major change to the structure and content of the program or program segments directed. Exercise discretionary authority to approve the allocation and distribution of funds in the organization's budget.

b. Exercise final authority for the full range of personnel actions and organization design proposals recommended by subordinate supervisors. This level may be credited even if formal clearance is required for a few actions, such as removals and incentive awards above set dollar levels.